

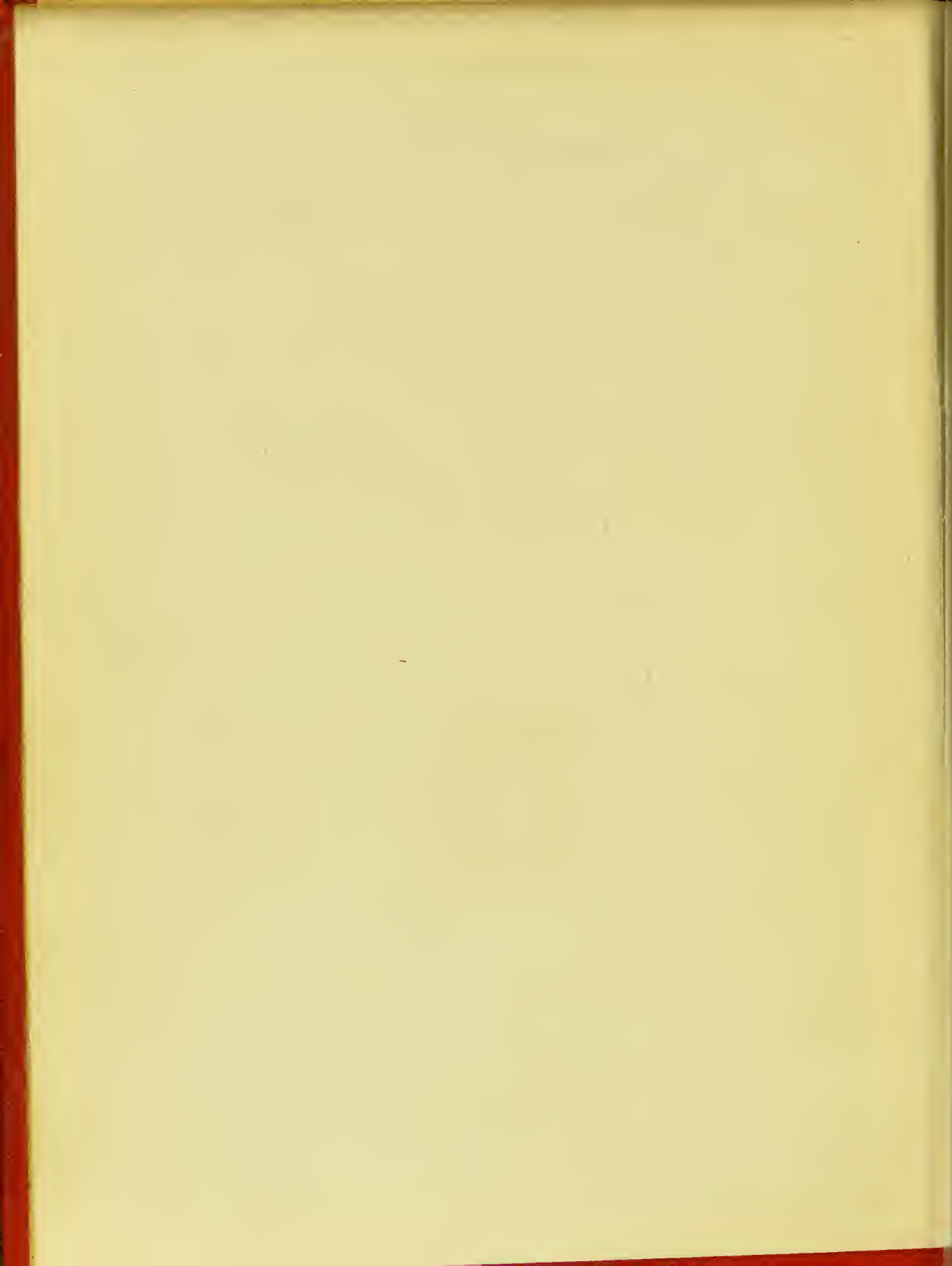
DISEASE AND RACE

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BY

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P R E F A C E.

THIS is an endeavour to show some continuity in disease, to evolve a little order out of the existing chaos ; for mankind is accustomed, so far as the racial effects of disease are concerned, to look at these things darkly, things of paramount importance to the welfare of all races, — and medicine is an edifice without mortar, valuable and innumerable facts with but little cohesion or relation one to the other.

Brevity has charms for the latter day reader, and these pages have been much excised and condensed. Not one-third of the evidence is set forth, that might have been adduced in favour of the ideas here endeavoured to be shown or suggested; yet, if they be true, facts will accrete

upon them in process of time, so as to form a conglomerate mass; and if they be not true, I shall be the first to assist at their burial.

The condensation in Chapters IV. and V. gives them a somewhat disjointed appearance, but no doubt the reader will follow the points endeavoured to be made, without the connecting matter.

It must be understood that the desire is to indicate a path for thought, rather than to state a complete "cut and dried" idea, the nucleus of a hypothesis, a suggestion rather than a theory, a nucleus which the extension of knowledge and research will complete, or condemn.

JADROO.

DISEASE AND RACE.

CHAPTER I.

LEPROSY is probably the most terrible, the most prolonged, and most hopeless disease known to mankind. Hope there may be, but it is an unrealizable hope, as, though the disease may hide itself for a time, it is but for a time, and breaks out again with renewed vigour from its temporary rest. The anæsthetic, or original form of leprosy, is also probably the oldest disease of which man has any record, but in leprosy there is undoubtedly a confusion of nomenclature, and how some of this confusion has arisen it shall be my endeavour to show.

“Greek Elephantiasis,” says Dr. Bateman,—

and this description has been given the stamp of approval of Sir James Simpson—"is principally characterised by the appearance of shining tubercles, of different sizes, of a dusky red or livid colour, on the face, ears, and extremities ; together with a thickened and rugous state of the skin, a diminution or a total loss of its sensibility, and the falling off of all the hair except that of the scalp.

"The disease is described as very slow in its progress, sometimes continuing for several years without materially deranging the functions of the patient. During this continuance, however, great deformity is gradually produced. The alæ of the nose becomes swelled and scabrous, and the nostrils dilate ; the lips are tumid, the external ears, particularly the lobes, are enlarged and thickened, and beset with tubercles ; the skin of the forehead and cheek grows thick and tumid, and forms large

and prominent rugæ, especially over the eyes ; the hair of the eyebrows, the beard, the pubes and axillæ falls off ; the voice becomes hoarse and obscure ; and the sensibility of the parts affected is obtuse or totally abolished, so that pinching or puncturing them gives no pain. This disfiguration of the features of the countenance suggests the idea of the features of a satyr or wild beast, whence the disease was by some called Satyriasis, and by others, Leontiasis."

"As the malady proceeds, the tubercles begin to crack, and at length to ulcerate : ulcerations also appear in the throat and in the nose, which sometimes destroy the palate and the cartilaginous septum ; the nose falls, and the breath is intolerably offensive. The thickened and tuberculated skin of the extremities becomes divided by fissures and ulcerates, or is corroded under dry sordid scabs, so that the

fingers and toes gangrene and separate, joint after joint."

Dr. Schedel, in the *Library of Medicine*, says, "The disease sets in with erythematous patches, followed by yellowish brown tubercles and livid red tumours."

Rayer says, "Elephantiasis is characterised externally by shining and oily-looking dark patches, which presently assume a dusky or bronze colour."

All authorities are agreed it is a disease commencing with discoloration of the skin, followed by dark or livid tubercles.

In all the references to *Lepra Hebræorum* in the Bible, there is no ambiguity of description regarding some of the symptoms, and there can be no manner of doubt that the *Lepra* of the Hebrews is an entirely distinct disease from the *Lepra* or Greek Elephantiasis of the present, or indeed that of the Middle

Ages. In Exodus we find leprosy referred to as "white," and in the Book of Kings as "white as snow"; in fact, in most of the references of the Old Testament to this disease, there is no ambiguity about *this* point, although there is much vagueness about the description. It is described as a "white disease," or as "white as snow;" clearly a very different disease to that we now know as Leprosy, or Elephantiasis Græcorum. Sir Risdon Bennett, in his work, *Diseases of the Bible*, supports the view that the Leprosy of the Old Testament was a different disease to that now known as Elephantiasis Græcorum; Bateman regarded it as identical with the Leuce of the Greeks, and there can be little doubt that by the word Leuce, Jewish leprosy was meant. No resemblance, then, whatever can be found in the Pentateuch descriptions of Lepra Hebræorum, though probably a squamous

disease, to *Lepra Græcorum*, except, possibly, to some rare cases of the strictly anæsthetic form of the latter. The characteristic colour of Jewish leprosy is white,¹ and of Greek leprosy dark, livid, or bronze.

It must be inferred, therefore, that Greek leprosy did not exist at the time of Moses, or rather at the time the Pentateuch was written, either in Egypt or Palestine.

Now Hippocrates, circa 400 B.C., does not mention *Elephantiasis Græcorum* as we know it, but apparently refers to the Jewish, or white leprosy, as the "Phœnician Disease." Lucretius, about 65 B.C., speaks of *Elephantiasis*, "which is caused by the river Nile,"² and Galen, about 160 A.D., says it is common in

¹ Rayet, p. 1144, on *Diseases of the Skin*.

² There is the disease, leprosy (*Elephas*), which has its rise in the river Nile, in the middle of Egypt, and in no other country.—LUCRETIUS.

Alexandria ; but it is doubtful whether Galen refers to the white or the livid disease. Celsus, about 18 A.D., first clearly describes Elephantiasis Græcorum, or true Lepra, and also speaks of Egypt as the home of the disease. It is very doubtful if Herodotus, in his references to Lep̄ra, speaks of any other form of the disease than the anæsthetic, as he also associates the word Lepra with Leuce, that is, Tsarath, or Jewish leprosy.¹

Aretæus gave as a reason for the name Elephantiasis, "that it is disgusting to the sight, and terrible in all respects" ("Est visu fœdus et in omnibus terribilis,") like the beast of the same name.

Pliny says "that the home of the disease is Egypt," ("Egypto peculiare hoc malum,") and had not been seen in Italy before the time

¹ Bateman.

of Pompey. It is not likely that, had the disease been very long in existence, it would not have crept round the shores of the Mediterranean. Taking this into consideration, and also the fact that the disease is not before mentioned by the Greek writers, it must be inferred that the disease was new to the northern shores of the Mediterranean.

My suggestion is, that Elephantiasis, or true Lepra, is a hybrid disease produced by the combination of two diseases, Jewish or white leprosy, the character of which resembles more nearly the anæsthetic form of the present disease, and a new disease, that is, new at that time to Asia Minor and the countries bordering on the Mediterranean.

I would here suggest—reasons for which I will show later—that the home and origin of the new disease was America, north and south, and that it had crossed the Pacific in some way,

possibly in a Japanese or Chinese vessel, and thence slowly spread across Asia to Egypt, where the disease, meeting with the existing form of leprosy, and becoming modified by the repeatedly co-existing in one individual, the two diseases produced a compound or hybrid, taking most of the effects and symptoms of each of them, and continuing their course through succeeding generations as one disease, *neither being to a sufficient degree either hereditary or contagious to extinguish the other by successive natural inoculations.*

The disease, as we now know it, and as known in the Middle Ages, is stated to have been first heard of among the Persians about 700 B.C. (For the present I am not taking into consideration the disease known as Elephantiasis Arabum, which is probably of great antiquity, and is possibly intended in the descriptions in the Book of Job.) It is next

heard of in Greece, and thence spread more and more rapidly with each extension of the Roman arms in southern Europe. Sir J. Simpson's articles on "Leprosy of the Middle Ages," and Professor Virchow's accounts of this disease, record its gradual spread throughout Europe.

It had spread to such an extent in the year 757 A.D., that King Pepin enacted laws with regard to the marriage of lepers, and his son, Charlemagne also, in 789. Leper hospitals, or Lazarettos, were established in France in the eighth and ninth centuries; in Ireland in 869; in Spain in 1007; in England in the eleventh century; in Scotland in the twelfth; and in Norway in the thirteenth.¹

There can be no doubt that there was a great increase of leprosy in Great Britain

¹ Robson Roose, *Leprosy and its Prevention*.

immediately after the Conquest, the infection being probably brought over in the army of William the Conqueror, or in the rabble that followed it. The disease at this time being comparatively new to the race (I do not mean by this that leprosy was non-existent in Great Britain before 1066, but that the cases were comparatively rare to what they were in the next century), each case became a new centre of contagion; for, however slightly contagious the disease may be in its old age, there can be no doubt that at this time it was so in a marked degree, or our forefathers would not have made such stringent regulations regarding it, with a view to isolating and preventing the spread of the disease.¹ Between the time of the Conquest and 1472 there were built in Great Britain 109 hospitals for lepers. If at this

¹ In a recent authoritative report the disease has been declared to be non-contagious.

time leprosy had not been contagious, we may be sure our forefathers would not have gone to all this trouble to separate the diseased from the healthy. And this belief in the contagiousness of leprosy would be solely a matter of observation with them, and would not depend on the ignorance or superstition of the times for its persistence; for the belief prevailed throughout these centuries. The last hospital in England of which we have record was built at Highgate, in 1472, and the last in Scotland, in Edinburgh, 1591.¹ There were also in London or neighbourhood hospitals in St. Giles's, the one at Highgate before mentioned, Mile-end, Kingsland, Shoreditch, Southwark, and St. James's. This latter hospital, which stood where St. James's Palace now stands, and of which the existing Chapel formed part, was

¹ Sir James Simpson.

exclusively for women. There were also, probably, hospitals of which we have no record, but reckoning the population of Great Britain in the year 1365 as 2,500,000,¹ and the average as sixteen cases in each hospital, the lepers would be as about 1 to 1,000 of the population when the disease was most prevalent.

But we must bear in mind that here, in those days, as in other countries at the present time, the reluctance of the friends of the patient to hand over their relative to what was in effect an outcast existence, a living death, would cause many cases to be kept in secret at their own homes, and there is no doubt that this frequently occurred among the wealthy.

Robert Bruce, of Scotland, continued to perform all the duties of a sovereign long after he

¹ The Black Death epidemic had fifteen years before destroyed about half of the population.

became a leper, and until a short time before his death from leprosy in 1229.

This belief in the contagiousness of leprosy prevailed not only throughout Great Britain, but also on the Continent of Europe, where numerous hospitals were built to isolate the cases; and it prevailed equally among the physicians of the Middle Ages.

The Roman physician Aretæus, after describing elephantiasis, says, "Seeing the infected with this disease are such, who would not fly them, or who would not turn aside from the leper, although he were a son, or a father, or a brother, since there is fear lest the disease should be communicated ('quum metus est ne morbus communicaretur'). Hence many have banished those who were nearest to them into solitudes and mountains." Cælius Aurelianus strongly insists on the contagiousness of leprosy, and recommends the isolation of

those affected as a measure necessary to the public health.¹

Many lepers were burnt alive in the time of Edward II., in whose reign the disease was very common, owing to the suspicion that they had conspired to poison the springs and fountains ; and a great many Jews were at the same time punished, and their goods confiscated, for the same reason.²

This was an idea that took most classes during the Middle Ages in connection with epidemics, and many innocent persons,³ and Jews particularly, were judicially murdered for well poisoning—a notion that has nearly always arisen in the ignorant peasant mind, in the presence of a particularly calamitous epidemic, when the Reaper has been very busy. This

¹ Sir James Simpson, *Leprosy of the Middle Ages*.

² Lyttleton's *History of England*.

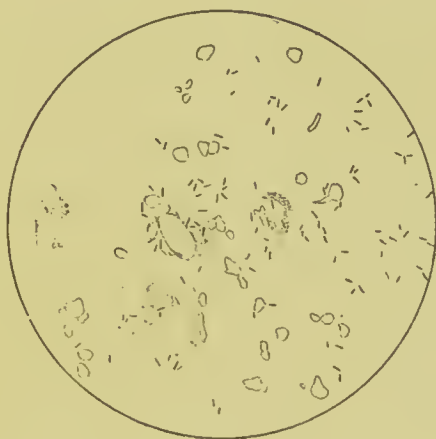
³ Hecker's *Epidemics of the Middle Ages*.

idea was recently revived among the barbaric peasantry of South Russia.

Avicenna asserted that leprosy is not only contagious but infectious.

Gilbert, an English physician, about 1270, and Bernard Gordon, Professor of Medicine at Montpellier, who wrote in 1309, John of Gaddesden, Professor of Medicine at Merton College, Oxford, about 1310, and Guy de Chauliac, about 1363, give very long and close descriptions of this disease in order that the disease should be correctly diagnosed, the patient adjudged a leper, separated from the people, and consigned to a lazaret-house, and for no other reason than their entire belief in the contagiousness of the disease. Any amount of evidence might be produced to show the most absolute belief of our forefathers in the contagiousness of the disease ; and we cannot condemn twenty to thirty generations for such

crass want of observation and stupidity as disbelief in its then contagiousness would imply ; and yet, during this year a committee of experts—no doubt the best men to be found for such a commission—have declared the disease



Leprosy Bacilli. $\times 750$.

to be non-contagious, which clearly shows that the disease has undergone a great change since the Middle Ages in decreased virulence (except among a new race) and decreased contagiousness.¹

¹ Dr. Hansen considered that Leprosy is spread entirely through contagion or heredity. Dr. Danielsson supports

However slightly contagious the disease may be now in its old age—and undoubtedly at the present time it is but weakly contagious—yet I think I have shown that it has been held to be contagious for over 1500 years by all races which have been subject to it, and in the youth of the disease it was held to be markedly contagious. From the beginning or middle of the sixteenth century the virulence and contagiousness of the disease has been continually decreasing (except in those instances where it has been attacking a new race, a race not before subject to it), until at the present day, among the civilised or white races, the disease has almost ceased to exist. What is the reason of this?

the view as to the hereditariness of leprosy, but thinks it only slightly contagious.

“Contagion must be looked upon as the principle (cause!) of the disease.”—Sir M. Mackenzie on *Leprosy of the Air Passages*.

CHAPTER II.

PROBABLY about the year 1380 syphilis was slowly produced in Europe, and in its earlier and epidemic condition, the symptomatic similarities to its parent disease were much more marked than at present. There can be no question that for one hundred years, when in its most virulent form, it was regarded as a modification of leprosy, and the cases were treated in the leper hospitals.¹

It has been asserted by some chroniclers (Freind, *History of Physic*, in particular) that syphilis was brought back from America by

¹ G. Torella, according to Freind, is the first who clearly describes syphilis. He speaks of it as though it had been for some years in existence, as mercurial unction was then used for it.

the crew of Columbus, but I fail to find sufficient support for this contention, except so far that a new and more epidemic form of it was imported. Hecker says,¹ that there was an epidemic of syphilis among the army of Charles VII. before Naples, in 1495. From Italy a more virulent epidemic of it spread throughout Europe; but it would appear that syphilis was prevalent in England before 1495, and it was almost certainly existent in England fifty or sixty years previous to this date. It is also probable that for long after this date it appeared, together with leprosy, in the one individual, and was for many years diagnosed as leprosy by the physicians of the time. There can be little doubt, also, that in the youth of the disease it would be difficult to distinguish it from the parent disease leprosy,

¹ *History of Epidemics*, Chronological Survey.

except when it occurred in a very epidemic form.

Since the end of the fifteenth century, therefore, when syphilis was first recognised as a distinct disease, a continuous natural inoculation of syphilis has taken place, having the effect (1) of eradicating the parent disease, which was the least contagious, in the most civilised countries, or in other words, in those countries where its reaching every unit of the population, in a greater or less degree, is ensured by the greater frequency of locomotion, or the continuous intercourse, intermixture, and blending of its peoples; (2) the rendering much weaker, and less virulent, the other disease from which the hybrid is formed; and (3) a gradual tendency to eliminate itself, as it more nearly approaches the saturation point in the race.

If one considers the effect of the repeated inoculation of the race by syphilis through five

centuries, and the accumulated modification that during so many generations the race has acquired, it will not be surprising that syphilis, that is, so far as its effects upon our race go, and also upon most European races, has lost much of its power. When one reflects upon the degree of permeation that a disease like syphilis would have from its hereditary transmissibility, and its persistence through each generation for five centuries, during which it is continually adding to that modification of the system acquired more or less from both parents, it must be evident that, so far as our race is concerned, we must be rapidly approaching a saturation point. Indeed, it will be manifest to any medical man that syphilis, from his own observation, is weaker as a poison than it was in his youth. The continued descent of the disease, and its continuous modification by descent, is a question of figures. If one reflects that every

individual having had two parents, four grandparents, eight great-grandparents, and sixteen great-great-grandparents, and the multiplication is continued for 500 years, it will be found that each person will have some thousands of ancestors; then he will clearly see to what an extent, during the centuries since its appearance, syphilis must have modified the races that have been subject to it. The extensive ramifications of such a disease, inevitably affecting all the members of a race, more or less, will be manifest to any one giving the subject but a very little consideration. It must be borne in mind that the disease in its epidemic forms would be much more contagious, as well as hereditary, than it subsequently became. Now, if it be assumed that one male in five or six generations acquired the disease, and he transmitted it modified to most of his descendants, the ramification through the race will be

evident. And this must not be viewed from the present impaired hereditariness and contagiousness of the disease, but that of the mean position of the disease of say, 250 years ago. I find the following passage in Rayer, *On Skin Diseases*: "In the epidemic syphilis of the fifteenth and sixteenth centuries, venereal eruptions occurred so commonly a short time after infection, that the disease was regarded as a contagious affection of the skin. At the present day, and indeed for a long time past, these eruptions have been much less frequent, and have always appeared at an epoch much more remote from the seat of the poison than they did formerly. This circumstance is explicable from the disease, during several ages, having been transmitted almost exclusively by the intercourse of the sexes without primary general infection. If the extreme frequency of primary or local symptoms at the present day be considered,

cutaneous eruptions may even be said to be rare. It would appear that in consequence of the great number of transmissions, the venereal poison has lost something of its original energy, and that its general effects on the system had in consequence become less common. It is certain, moreover, that the poison is neither so readily transmitted, nor possessed of such virulence at every period of the existence of the sores and discharges by which it is propagated."

Our records of gonorrhea as a distinct disease do not go back very far,¹ but I shall endeavour to show some grounds for the view that gonorrhea and leprosy produced syphilis, or in other words, that syphilis is a hybrid disease,

¹ Ali Abbas, about 1100, Freind says, describes it (vol. i., p. 40), which is the earliest record of it I have found. Gordon says, 1305, that gonorrhea is "*ex commixtione cum fœda muliere.*"

formed by the repeated and continued co-existence of the two diseases together in the same individual.

The following passage is from a footnote in Rayer, which gives another view as to the antiquity of gonorrhea : “ There is no mention made in any part of the writings of Hippocrates of a painful and contagious flux of the genital organs. Celsus speaks of the ‘minae profusiones seminis,’ but not of blenorrhagia or flow of mucus, *de re medica*, lib. iv., sect. 21 ; Swediaur and several other writers have interpreted this passage amiss. Neither does Galen treat of more than a flow of the seminal fluid, ‘igitur gonorrhœa instrumentorum seminis affectio est non pudendorum.’

“ We read, however, in a book much anterior to any of the writings quoted, Leviticus to wit, some very strict ordinances relative to men labouring under a flow of semen ; and it seems

much more probable that the question here is of a true blenorrhœa (gonorrhœa), than a flux of the seminal fluid. It is very likely, therefore, that blenorrhagia was frequent among the Jews. In Europe it was certainly rare before the end of the Middle Ages. Brassavolus 'De morbo Gallico,' and Fernelius, 'De morbis contagiosis,' are generally allowed to have been the first to have described gonorrhœa as an effect of the morbid poison, lues veneræ; and Astruc assures us, and the opinion is shared by Fallopius, that venereal gonorrhœa *was not observed during the earlier periods of the epidemic of the sixteenth century.*"

Now, at first sight, this statement would appear to be directly opposed to the views herein sought to be explained; and as this is, as far as I am aware, the only evidence I have met, that is antagonistic to those views, it is therefore included here. It is clear that Astruc

and Fernelius, in describing the disease, described it as they knew it in their locality, and after the hybrid had been formed. Undoubtedly the hybrid had better chances of transmission from person to person than one of the parent diseases, gonorrhœa, as immediate and direct contagion was required to communicate the parent disease, while the hybrid was transmitted from one person to another, frequently in other and more indirect ways.

It was clear that syphilis existed in their districts independently, although in some parts of Europe it is unquestionable that the parent and hybrid disease frequently co-existed, even down to the year 1800. Moreover, it is well known that one epidemic of any disease may differ considerably in some of its symptoms from the epidemic next following it, or from the one immediately preceding it; especially is this so in epidemic diseases that are compara-

tively young, as syphilis was at this time, as, indeed, the symptoms of typhoid or of any other epidemic might vary to-day, coming from different centres of production; and the farther the epidemic reaches from such centre, it would tend more and more to throw off extraneous and unessential conditions of contagion; and those symptoms which are unusual and peculiar, and arise peculiarly from the particular circumstances that brought about its inception in that locality where the epidemic was formed.

So late as the year 1760 the two diseases syphilis and gonorrhœa so frequently co-existed that they were regarded as one disease.

It is well known how convinced Hunter was that the two diseases were one, and Rayer also held the same view, as on page 765 of his work on *Diseases of the Skin* he says: "The development of venereal eruption after syphilitic gonorrheas and the engenderment of

venereal sores by the contact of gonorrheal matter, and the contrary, induces me to believe that these several affections are different effects of the same cause." This was the belief universally held until the publication of Balfour's treatise, *De Gonorrhœa. Virulenta*, in 1767, at Edinburgh.

Leprosy in India, and indeed throughout the world, is a decreasing disease, and not, as has been urged, an increasing disease. In comparing the Indian statistics of 1881 with that of 1891, there is a decrease of some thousands; and in this matter the report of the special Commissioners, recently published, must be accepted, as it is hardly possible that any person or persons have had so good an opportunity of forming a correct judgment. With regard to the geographical distribution of leprosy reported by the Commissioners, similar views were stated by Sir J. Simpson more concisely

and clearly.¹ It was Sir Erasmus Wilson who suggested, I believe, a malarial causation of leprosy, while Mr. Jonathan Hutchinson considered the disease to be caused by eating salt and putrid fish.

In Great Britain leprosy lasted longest in the most distant parts, where the hybrid disease, syphilis, would reach least and latest—Cornwall, parts of Ireland, and chiefly the islands of Scotland.²

Leprosy is contagious in direct proportion to the virginity of the soil it is planted in, or in other words, to the youth of the disease relatively to a race.

Statistics show that Europeans in India, though not exempt from it, yet very seldom take leprosy, and that Eurasians, in proportion

¹ I saw a typical case of tubercular leprosy in Ghent in 1893.

² Sir J. Simpson mentions lepers in Shetland in 1736.

to their European blood, have comparative immunity as compared with natives ; while the natives of India are far less susceptible to the disease than the South Sea Islanders, to whom the disease is new.¹

¹ A work on the Recrudescence of Leprosy has been published by Mr. Tebb. The object of the book is to show (1) that leprosy is increasing ; (2) that the increase is largely caused by vaccination. That there has been an increase among races new to the disease, and who formed a virgin soil for it when first planted ; particularly among those living in the Islands of the Pacific Ocean, whom it must have ultimately reached by the ever-increasing inter-communication and interspersing of the races, is undoubtedly true and well known, so well known, in fact, that so far as this point was concerned, Mr. Tebb was painting the lily. Yet this increase is purely local, and does not affect the aggregate. Mr. Tebb's work is, however, a handy collection of facts, and although the facts have mostly been selected to support his case, yet Mr. Tebb reluctantly supplies the evidence for the entirely demolishing his own position. This evidence Mr. Tebb supplies in the statistics before referred to. For, however much the disease has in-

A gradual and continuous inoculation, or "vaccination," as it were, through successive generations of white races, has almost eradicated leprosy from those races.

Leprosy in India and elsewhere, at the present day, more readily attacks any native of those races through whom the hybrid disease has not so nearly approached the point of saturation as it has in Europeans; and the reason for this is, that the great majority of the natives scarcely ever move from their own immediate neighbourhood. Millions live, marry, and die in their villages, without any inclination to travel further than the adjacent village or town; in other words, locomotion, and the desire for locomotion, is scanty, and conse-

creased in the sparsely populated Islands of the Pacific, this increase will not materially affect the decrease shown in the vast population dealt with in the Indian statistics.

quently inoculation of syphilis, and its hereditary transmission and modification are less frequent.

In a strictly agricultural, as opposed to a commercial race, there is so much less intermingling of the people, and less intermarriage between persons living at a distance, that the hybrid disease has so much less opportunity of spreading, with the resultant tendency to reduce the prevalence of the parent disease.

Such a disease as syphilis must necessarily spread more rapidly among active, energetic, commercial races, ever moving and travelling from place to place, than among a race agricultural, apathetic, and always living in one locality. The railway and the steamship are in this sense prime exterminators of disease, paradoxical as it may seem, because they the more rapidly spread them. This applies to those

diseases that confer immunity from a second attack.¹

The following paragraph from the *Engineer* will illustrate what I mean. "According to data collected by the Railway Department at St. Petersburg, the passenger traffic on Russian railways is fifty times below that of Great Britain. For every hundred of the population there are only forty-four passengers in Russia ; while in France, United States, Belgium, and Great Britain the figures are respectively : 660, 826, 1,072, and 2,163."

These numbers may be taken as a rough approximate representation of the commercial activity and industrial energy of each race, which alone must be some indication, however slight, of the degree of civilization of a race. It is clear that the greater the intercommunica-

¹ *Vide* Rule 8 in the Epitome.

tion of a people, the greater the intermingling and intermarrying of the race—that is to say, marriage with others not of the immediate neighbourhood,—it must be manifest that the greater such degree of intercommunication, the more rapidly such a disease as syphilis will permeate the race, and *vice versa*, the more agricultural and stay-at-home the people, the more slowly will it permeate, and the longer will leprosy exist in it. And this applies not only to the modified congenital or hereditary effects of syphilis, but also to the primary infection of the disease; and it is the former that I am now considering.

Legislation may slightly reduce that degree of permeation by the reduction of the primary poison, as no doubt it is now doing in France; but it is very questionable whether it be wise in the long run.

Legislation also in this country had the same

deterrent effect; that is to say, by measures preventing the spread of the primary infection, the racial or hereditary effects were much reduced for the time, but by one of those waves of unthinking impulse more frequent among the Latins than the steady Anglo-Saxons, that portion of the Contagious Diseases' Act was repealed. In the name of the Prophet, Statesmanship! what thought had the hysterical repealers of benefit to the race that might accrue from the repeal? Certainly, none. This wave of faddistic sentimentalism, untempered by judgment, that fortunately seldom takes the British Parliament, the many led by the few, those who did not consider what the result might be, led by those who would not, because they shouted the loudest, abolished an Act that, according to the best light of that day, was doing much good, and solely to gratify the unthinking narrowness of this few.

Happy that nation where even the imbecilities of its legislature tend to the benefit of its people!

Narrowness in the everyday individual is venial and to be expected, but in one having authority it is an unpardonable crime.

It is probable that while all scrofulous symptoms are decreasing manifestations of hereditary syphilis, that tuberculosis and its skin manifestation, lupus, are hybrid diseases or modifications descended from syphilis. Undoubtedly many cutaneous diseases at present classed and catalogued under different headings are merely decreasing congenital results of syphilis in a former generation, varying in the form of its manifestations, according to whether it be earlier or later, that is, the number of generations since it was acquired, and which, when acquired, was probably most virulent, and possibly untreated or wrongly treated.

There were really two forms of scrofula—the older disease a direct descendant of leprosy, long known as king's evil, which is practically never now seen, except as merged in the modern form, also descended from leprosy, but through the intermediary of syphilis. There were undoubtedly points of difference between the struma of the present day and the king's evil of the Middle Ages.

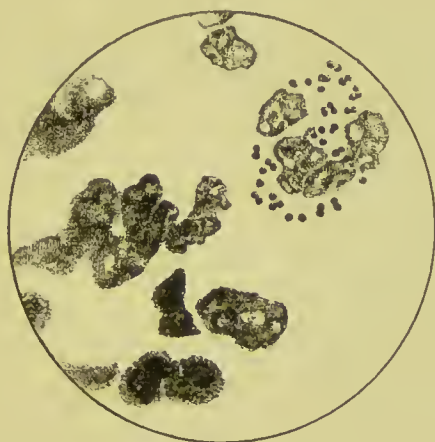
Further, and this is only specifying in the individual what occurs in the aggregate, one form of modified syphilis may be more or less antagonistic to another, whether acquired or congenital, as for instance, when two persons marry, the male with acquired, and the female with congenital, the offspring is less likely to show symptoms of the disease, than if one only of the parents had the disease. It is true, the germ may be dormant in the child, either as bacillus or as spore, which may afterwards

show evidence of vitality and growth by something subsequently affecting the system.

Many of the skin diseases at the present day, in a too slavish following of Willan and Bateman, are divided and sub-divided in a somewhat fantastic manner, some indeed, that are referable to one simple cause, *i.e.* the acquired, or congenital, or hereditary conditions of syphilis or its descended form, scrofula. Some of these sub-divisions remind one of those physicians of Edward IV., who, following the ideas of previous authors, and of their own time, divided leprosy into four kinds, viz. Leonina, Elephantia, Tyria, and Alopecia.

It must be borne in mind with reference to one of the parent diseases, in considering the subject, that as one attack of gonorrhœa does not apparently confer any immunity, that therefore the hybrid disease syphilis would have little effect in reducing the virulence of gonorrhœa

relatively to the race. Nevertheless, it is decidedly less virulent than it was two hundred years ago, and rheumatic pains less frequently occur. Gonorrhœa is a suppurative micrococcus, and the suppurating organisms do not



Micrococcus Gonorrhœæ. $\times 1000$.

usually confer any immunity. Possibly, originally staphylococcus pyogenes aureus, or the micrococcus of trachoma, continually cultivated at one temperature in a certain medium, "fœda muliere," originally produced gonorrhœa.

This comparative immunity, from certain

diseases is not the least of the gifts that an individual of a civilised race may to-day inherit; and though his immunity has been purchased largely at the expense of his forefathers, and by what in their day, and indeed to a considerable extent in ours, would be regarded as their sins, will probably be looked upon by our more enlightened and less hide-bound-in-prejudice descendants as not so much the sins of the individual, but the sins of the social system, and the natural effect of the ideas prevailing as to the relations between the sexes. In some things progress is so slow. What would be thought of the man or race that nowadays went to the Middle Ages for a design for ship-building (except as a curiosity), or referred to Archimedes or Hiero for the best and most reliable ideas in machine construction for use to-day? Nevertheless, this is our attitude in many of those things that most

intimately affect our social life, and the welfare of the race. Let the past bury its past, and precedent be the mute at the funeral; what has been is no more likely to be the correct rule of social conduct, than what is, and even less. Why should those imaginary fetters that bound the prejudices of our fathers bind us socially, any more than their political views now hold us?

That the American Continent was either the original home of leprosy, or one of its modifications is extremely probable, by the fact of the comparative immunity of the pure-blooded aborigines of America from leprosy; and this does not shut out the possibility that the disease arose and ran its course in America prior to the commencement of the disease in the Old World from a like cause. Nevertheless, if this were so, it is clear that the American form of the disease was either more hereditary

or more contagious, or was slowly eliminated by means of a hybrid disease, which possessed either or both of these attributes.

Unquestionably a form of syphilis existed in the West Indian Islands, at the time of Columbus's first voyage, and had been in existence there for many years; for we have it on record that Gonsalvo Ferrand,¹ after becoming infected himself, at the siege of Naples, in 1495, made the voyage to the West Indies specially to find out how the natives treated the disease, and on his return set up as a practitioner himself in the new disease in Spain, and gained a large fortune by treating it with guaiacum, of which, it would appear, he had a monopoly for a few years. No doubt there were many points of difference between the Old World syphilis and the New World

¹ Freind's *History of Physick*.

syphilis, notably in the greater epidemicity, and therefore, contagiousness of the latter.

It is probable that the European syphilis arose a little before the end of the fourteenth century. It would certainly appear that John of Gaunt died of this disease in 1399. In 1492, on the introduction of the New World syphilis the one became gradually merged in the other.

CHAPTER III.

IN Pathogenic Bacteriology we are on the confines of a vast unexplored field of science, groping our way forward into the dark, each day onward bringing a little more light; and, although much solid ground has been reached, much is shifting and uncertain; this that seemed sure ground turns out to be mist, that which to-day is supposed to be solid is to-morrow a bubble. I know how strong a case may be made out for annexing bacteria to the vegetable kingdom, and that the so adjudging them is the prevailing view since Davaine published his opinion. They are, no doubt, in that almost indeterminate border-land between the two, some of them appearing to incline in the one direction, and others in the other; yet, in spite

of the prevailing view, I have, in this work, considered by implication some of the pathogenic forms as belonging to the animal kingdom, partly upon what I have myself observed, and partly owing to the difficulties surrounding any attempt to draw a sharp line of demarcation, where the one merges so imperceptibly into the other.¹

The exhaustion of the nutrient theory causing the immunity in disease is untenable, if one looks any further than the threshold. Many varying theories as to this have been published, but it will be *thus* far clear, I think, that the immunity is produced, either by so treating

¹ Any one who has watched the *Spirillum tenue*, in a hanging drop cultivation, will have doubts that this organism, at least, should be included in the vegetable kingdom. The microscope has not yet reached the limit of perfection, and with a much improved instrument, it is impossible to say what may be discovered.

the medium, the human body, that any new cultivation is rendered innocuous, *i.e.* that one cultivation leaves such traces behind it in the system, that the next cultivation of bacteria is harmless, or so in that degree proportionate to the previous saturation. Indeed, just as in varying cultivations, bacilli may lose their virtue or their virulence, as cholera spirillum or yeast in uncongenial media, so some colonies of bacteria in gelatine no longer increase after a certain time, although the nutrient medium is not exhausted.

It is a well-known fact that if the lactic acid fermentation once obtains a footing in a solution of sugar, for example, many of the other putrefactive bacteria find it impossible to develop.

It would appear that most of the pathogenic bacteria, which do not apparently confer immunity after one attack, usually in the mean-

time, that is to say, between the infecting one person and another, are cultivated in other than a living medium. If this does not happen, and the bacteria are conveyed directly from one person to another, the disease for a certain number of such continuous cultivations in living media, becomes increasingly virulent and more infectious and epidemic.

I am inclined to think, however, that there is no disease that does not confer a certain degree of immunity, however slight it may be, and insufficient to perceptibly affect the strong susceptibility *that* person may have for *that* disease.

In using the word *hybrid*, it must not be supposed that it is meant that the bacilli of one species by any sexual reproduction produce a cross with another (although the process of fission is still so much a mystery, and probably will remain so until some great improvement

is effected in the microscope), but rather that if two species be repeatedly and continuously cultivated together in a special nutrient and at a particular temperature, the whole cultivation will gradually acquire the characteristics of both the organisms, with a pathogenic result different from either, but partaking more or less of both of them.¹

Reasoning on this basis with regard to the leprosy bacillus and the micrococcus gonorrhœa, surely some substance which has a specific effect upon either of these, or rather the diseases produced by them, should also have some effect, even if slight, on the hybrid disease. Leprosy was, of course, at once excluded, as there is no known drug that has any appreci-

¹ We must bear distinctly in mind that the virus of a disease produces that disease only, and never any other, and that a virus received into the body multiplies indefinitely within it.—*Bristowe's Medicine*.

able effect upon it. The question then presented itself, which drug has the most specific action in gonorrhœa? At once experience gives the unhesitating reply—sandal-wood oil. Then, therefore, sandal-wood oil should have some effect on syphilis.

Two cases then being treated, and the next four that came in, were treated with sandal-wood oil for three weeks. In five cases the sandal-wood had the most marked effect, but in the sixth only a slight effect. The case in which there was the least result was a deep ulcer, about the size of a two-shilling piece; three were cases of sore throat, one of palmar cracks, and one of cachexia, condylomata, with nervous effects, depression, etc. In four of the cases sandal-wood oil in the form of mist. santal. flav. of a London firm was exhibited in six or eight minim doses three times daily; in the other two cases one drop doses of the

oil were administered twice daily. In each case the effects of the drug, from the symptoms induced, appeared to partake partly of the effects of mercury, and partly of those of iodide of potassium. In those cases in which the particular manifestations of syphilis were not removed, the sandal-wood oil had to be discontinued, owing to its causing a loosening of the teeth.

The great resistant power of either of these organisms, *i.e.* leprosy and syphilis, is one of their chief characteristics. Nothing can actually extirpate either of them, or perhaps it should be said, nothing that we yet know of, although treatment may render the conditions of existence more difficult for either of them, and in the latter compel a dormant condition. In what particular form, spore or other, the syphilis bacillus hides itself away, and remains dormant somewhere in the lymphatics, possibly

for years, and it may be for the life of its host, and what are the particular conditions other than that of ill-health, or a lowered vitality, or the presence of another organism, which induces it to recommence its activity, to become rampant again and manufacture its specific poison, are subjects for future investigation.

There can be very little doubt of the descent of tubercle from scrofula, and also that scrofula is syphilis in a modified form, from continued congenital transmission. If I were here to adduce all the evidence of similarity with the view to trace their connection, it would fill a work four times this size, and beyond what was intended. Indeed, the pathological and symptomatic resemblances between tubercle and scrofula, scrofula and syphilis, and syphilis and leprosy, are too well known to expatiate upon them.

The slow growth and long continuance are

the salient characteristics of each disease, and there is much resemblance between their specific organisms. (I am confident that it will be found that acute tuberculosis is produced by a modified form of the tubercle bacillus, that is, modified by a difference of temperature and en-



Bacillus Tuberculosis. $\times 1000$.

vironment of cultivation, possibly a hybrid of tubercle and pneumonia.)

Scrofula is a stage between syphilis and tubercle.

I am aware that passages might be cited that indicate the prior existence of the disease tuber-

culosis as phthisis, that is, prior to the commencement of syphilis; but I cannot find a reliable description of the disease. Consumption was a word commonly applied in the Middle Ages to any disease inducing emaciation.¹ As an indication of the different use of words, sloughing leprosy, with destruction of the fingers and toes, was frequently called cancer in the Middle Ages.

The word *Struma* appears to have been applied indiscriminately to skin diseases by the Romans, but particularly indicated a swollen or raised condition of the skin, and the adjective "strumous" was not used until after the Augustine era. I cannot find, however, that it in any way implied a like condition to what is now known as *scrofula*, except that it implies

¹ The accounts of the disease from which Edward the Black Prince suffered and died are just as applicable to diabetes or internal cancer as to phthisis.

a swollen condition of the gland, but never a general condition of the system. The word was apparently used in a somewhat similar way to the old English word *tetter*, and the French word *dartre*, loosely used in a general sense as applied to the glands, as these latter terms were applied to diseases affecting the skin.

In the same way that both leprosy and syphilis are continually decreasing quantities and for like reasons, tubercle must necessarily decrease, and the disease grow milder with each generation as the continually acquired resisting power becomes greater.

I think it would be found on due investigation in the majority of those cases in which children develop tuberculosis between the ages of one and fifteen, that the infection was congenital, where it is possible to determine it, the bacillus transmitted from one of the parents to the offspring, although, of course, a small per-

centage of those under one year old acquire the disease with their milk.

In inquiries made into the family history of thirty-five cases of tuberculosis, there seems to me a greater tendency to transmit the disease to the offspring in those cases where the mother had it, than in those in which the father suffered from it (the subsequent acquisition must not be confused with the congenital transmission); and it would seem that there is less tendency to transmit the disease, paradoxical as it may seem, where both parents had the disease, but different forms of it, than in those cases in which one parent only had it.

Certainly one form of syphilis in one parent, say, slight manifestations of tertiary, will act antagonistically to a different form, say, congenital, in the other parent; that is to say, that the children of these parents are less likely to show any manifestation of syphilis, modified or other,

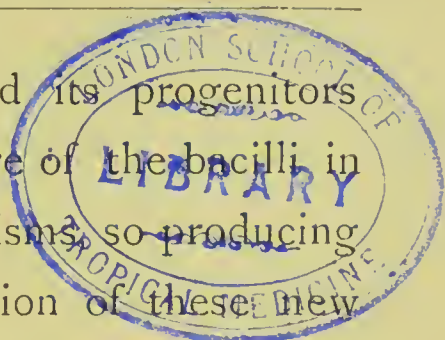
than the children of parents, only one of whom was syphilitic.

It may be that the syphilis bacillus, when in a dormant state, does not exist as a spore—indeed, it is unknown whether it has a spore condition—but in a somewhat analogous position to one of the yeast organisms, when from exhausted oxygen or nutrient media it exists upon its own protoplasm by “internal metabolism,” and only awaits a more favourable set of conditions to revive it.

And this alteration in the necessary conditions which causes the commencing again of the poison production after a long dormant condition, seems to be analogous to that condition of the yeast cells, which, at first necessarily ærobic, become gradually acclimatised to the new condition when the oxygen is exhausted, and continue their work as vigorously as before, manufacturing the necessary oxygen from the material surrounding them.

The cure of tubercle and its progenitors must be sought in the culture of the bacilli in conjunction with other organisms, so producing new forms, and the inoculation of these new or hybrid forms, rather than in the use of their excretions ; or for the production of a modification by the continued and repeated cultivation of tubercle bacilli in other media.

Although, no doubt, the tubercle bacillus, whether found in man, the cow, or the fowl, was originally one organism ; that is, it commenced in man and spread from him to the other domestic animals, and owing to its continued cultivation through many generations in different animals, and therefore at differing temperatures, viz., 37.8° C. in man, in the cow and the horse, 38.3° C., and in the fowl, 40° C., there are now certain apparently permanent modifications in each organism, according to its habitat.

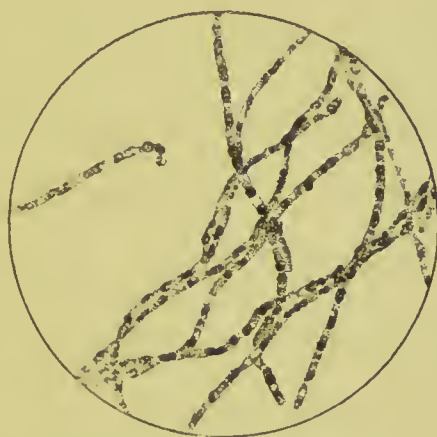


There is no fact so strongly tending to show that the original inception or formation of the commencing culture of this bacillus first took place in some animal, and most probably man, for the bacillus grows best, even in artificial cultivations, at man's normal temperature, whilst it will cease to grow above 40° C. The fact of its being difficult, except under very careful precautions, to cultivate the tubercle upon any other nutrient than blood serum, also tends to show that this bacillus has never known a purely saprophytic existence. All attempts to artificially cultivate tubercle were for a long time unsuccessful.

The writer has by continued cultures together of two distinct species of suppurative organisms in the same medium, found in the pus of a whitlow, produced a totally different organism from that in the first culture.

It is well known that the anthrax bacillus

readily changes its form and pathogenic results by cultivation, and the cholera spirillum cultivated outside the body loses its virulence. By continued cultivation in specially prepared broth at the body temperature through a



Anthrax Bacillus with Spores.
× 1000.

number of generations, this pathogenic activity may be, however, restored.¹

The earth bacillus, that so much resembles the anthrax bacillus, and which confers upon animals a certain degree of immunity after in-

¹ Woodhead's *Bacteria and their Products*.

oculation, is, no doubt, the original condition of anthrax, that requires cultivation in the necessary media and at the necessary temperature to become decidedly pathogenic. Thus the innocuous may become by natural cultivation in the required environments virulent, and the virulent innocuous.

“Non-motile organs of virulent anthrax are rendered inert by the growth amongst them, or alongside of them, of motile putrefactive organisms;”¹ and the action of the anthrax organisms was also considerably “modified by the growth with them of septic organisms, which in turn, when introduced into an animal by inoculation, were capable of producing a disease which might easily be distinguished from anthrax.”

Varying conditions and environment, therefore, produce different organisms with differing

¹ Woodhead, p. 84.

results pathogenically, if at all pathogenic ; and the *non-pathogenic*, by *suitable surroundings and cultivation*, may produce disease.

In those diseases in which one attack gives an after immunity, the system becoming saturated with the specific poison, the organism has a rapidly decreased growth under its continually changing conditions of cultivation, possibly in some cases to a want of oxygen. But in those diseases in which no apparent immunity follows the disease, the specific poison is in most cases produced by a local rather than a general cultivation, and the conditions for the production of the toxic secretions are altered by modification, *i.e.* other organisms of a suppurative or a putrefactive order take up their abode in the same locality, and not only modify the action of the first by their secretions, but also crowd him out, and ultimately render life impossible for him, and the disease ceases.

It is very questionable in some diseases, if two organisms are not necessary to the production of the poisonous secretion in such local cultivation, although having general results.

Pathogenic results will vary from the same organism, according to the part of the body in which they may be planted ; thus, a pathogenic organism placed directly in the circulation may be innocuous, while the same organism under cultivation in a wound may be fatal. The septicæmic micrococci, as also the organisms alleged to produce pneumonia and diphtheria, may exist in the mouth and be harmless.

On the other hand, in those diseases in which the organisms find their way into the blood, it is purely a battle between the cells and the bacilli. In death the cells are overpowered, but if the host recovers, the cells have, during the fight, in assimilating and throwing off excretory products of the bacilli, in continually

absorbing and changing the poison, and also absorbing the organisms themselves, so saturated their own protoplasm that they are not only better enabled to resist and throw out the bacilli on a fresh attack, but also to effect the organo-chemical alteration of their toxic secretions. While saturating their host with their own poisonous secretion, the pathogenic organisms are at the same time surrounding themselves with these products conducing to their own degeneration and decay, as it becomes increasingly difficult for them to obtain a supply of nutrient and, if ærobic, of oxygen.

It may also be possible that the cells themselves are the complement of the disease germ, and are necessary to the production of a disease poison. In other words, the joint cultivation of the respective protoplasm may be necessary to produce the poison. If this view be considered, it must be remembered that under

certain conditions a cultivation saturated, as it were, by its own excretions, ceases any longer to excrete. And thus, on the second attempt of the disease germ to find a lodgment, the cells no longer form this complement.

Vaillard and Vincent found that the presence of a second bacillus was necessary to the growth of the tetanus bacilli, and therefore the formation of the specific poison.

The fact that one organism may apparently produce not one result, but two different diseases, under differing circumstances, implies either that the organism has been developed under different cultivation, or that in the second case it is being modified by the presence of another organism. The toxic excreta of each organism will necessarily react upon the other.

The immunity produced from most diseases by suffering them has a certain analogy with the action of some drugs, such as arsenic or

morphia, which may become in ordinary doses almost inert by repeated and continuous dosing to saturation.

“ Sewall has pointed out that if the albumose contained in snake poison be given in very small doses to pigeons, it confers on them the power of resisting even seven times the ordinary deadly dose of snake poison three months after the inoculation has been made.”¹

Neither the views advanced by Buchner or by Metchnikoff quite suffice ; for, as against the former, among other facts, may be cited that of the earth bacillus serving to produce immunity against anthrax ; and as against the latter, immunity has been produced by direct injection into the blood of a pathogenic organism ; and it is just in those diseases in which a local cultivation produces the toxic poison that least immunity is conferred.

¹ Woodhead.

Given the necessary conditions of temperature and nutrient, the non-pathogenic organism may therefore develop into the pathogenic, and this again, under suitable surroundings, may be cultivated back to the non-pathogenic form, *naturally* or *artificially*.

And this is possibly true, to a certain extent, even with those disease germs, such as leprosy, syphilis, and tuberculosis in its various forms, although it might require an infinite number of cultivations, and under similar conditions to those by which they were produced, and in similar, though not necessarily living, media to effect this reversing process.

If it be true that the tetanus bacillus, in a new cultivation, in the dog's mouth develops into hydrophobia, then it is possible that the colony of bacilli may exist for some considerable time around or upon the teeth, or in the mouth of a dog, without producing rabies, in a

like manner to the apparently dormant existence of the bacillus of pneumonia in the mouth of a man. As the tetanus bacillus flourishes in the earth mould, it would be evident that a dog might easily plant a colony in his mouth



Tetanus Bacillus. $\times 1000$.

in gnawing a bone upon the earth. The striking similarity of some of the symptoms of the two diseases need not be dwelt upon. It is probable that another organism, co-existing and flourishing in the same cultivation, is necessary to the growth and development of tetanus into

that pathogenic condition known as hydrophobia.

In those diseases in which there is a local instead of a general cultivation of the bacteria, the cells would necessarily not have an equal opportunity of saturation by absorption, the province of the cells being to resist the admission; but when these are affected by the toxic produce of a localised cultivation, the poison is already in the blood, and attacks them, as it were, from behind, the cells, except locally, having to resist this produce, rather than the organisms themselves.

CHAPTER IV.

CIVILISATION, so far as corporeal racial effects are concerned, is that condition of the individual and of the race in which immunity, or an increasing tendency to immunity, from various diseases, is produced by successive inoculations of them. The word inoculation is here used in the wider or racial sense of repeatedly acquiring, artificially or naturally, and includes the receiving a disease by infection, contagion, or congenesis.

Thus, in the time of the Romans, the contact of the superior race with the barbarians did not mean death and a gradual extinction of the inferior, as it now does. The "barbarian," in a word, was physically the racial equal of the race thinking themselves the superior, and had

equal vitality. At the present day the pure-blooded aborigines slowly die out before the immunity in the blood of the civilised race, that immunity which the white races have acquired by long sufferance. Civilisation, with its sequelæ, is more deadly than war to most savage races; they fight disease naked, while the white races are encased in armour. The Maori in New Zealand, the aboriginal inhabitants of the Pacific Islands, and the Indian of North America might be mentioned as instances of the inferior race dying out in the presence of the superior. But no doubt in each of these cases this result is assisted, to a certain degree, by some of the baleful habits of civilisation; in particular—drink. Yet, while these may assist, undoubtedly disease is the principal factor in this result, and probably in the aboriginal race of New Zealand syphilis and phthisis are the chief causes of the gradual extermination.

As an instance of this, where many could be cited, the almost decimation of the Fiji Islanders by a disease that is now regarded by us as an infantile fever of slight importance, and from which death is of rare occurrence—measles.

Diseases such as asthma, which are most probably not in any way dependent upon any micro-organism, or if so, upon a purely local cultivation having a mechanically irritating effect, would no doubt be hereditary; but I do not believe that, *per se*, a disease such as consumption (tuberculosis) is hereditary in the sense that it is more likely to be acquired by predisposition. The tubercle bacillus may be transmitted to the offspring by either parent, and remain dormant as spores, or other condition, for years in the system—probably in the lymphatics—to be called into active existence either by a lower or some changed state of the system, or the actual presence of other bacilli

I believe that such offspring has much less likelihood of *acquiring* the disease than another person not having any hereditary trace of the disease. It is also my belief, founded upon much observation, that in phthisis, as in syphilis and scrofula, given good hygienic surroundings, the offspring of persons, both of whom suffer from one of these diseases, assuming they are differently manifested, are less likely to have that disease than the offspring of parents, only one of whom has that disease; always provided that the disease has shown itself in the parents in different and opposing ways. For instance, if tubercle in the glands in one parent, and in the lungs in the other, the one form or manifestation of the disease will act in a more or less antagonistic manner to the other, and tends to moderate the force of the other in the offspring.

Phthisis was a word applied by some of the

Greek physicians to a disease of the chest, probably, from the descriptions, pneumonia. Certainly it was a very heroic remedy to use the actual cautery in phthisis,¹ and run a red-hot iron through the pleura in pleurisy.² And as a sample of nomenclature, Freind says that Alexander mentions tubercle of the lungs "not attended with any expectoration or fever, but occasions a difficulty in breathing." I find no evidence whatever to show that the disease tuberculosis existed prior to syphilis.

Let any man of middle age recall the days of his youth, and reflect how numerous then were the persons one would meet marked with small-pox, and how very seldom he sees this now. This is not, as some persons might hastily consider, because the disease germ is any the less virulent, but because the soil is

¹ Celsus.

² Freind, quoting Paulus.

less fertile for its growth. Let that same infection that would to-day, probably in comparison, treat lightly a Londoner, be placed in the midst of some African tribe on, say, the banks of the Albert Nyanza, and see if it would not give an extremely good account of itself. And it would not only be that the germs appear to be more infectious, but they would also be more death-dealing.

A disease which in its youth may be powerfully epidemic, will, in its old age, become endemic among a people or peoples. In the case of the word endemic I use it in the sense almost continuously existing, and exclude that sense which implies local causes only ; for the local causes, though existing, may have originally been imported in earlier times during epidemics.

The aging of a disease relatively to a race will depend upon the degree of immunity it

confers ; that is, whether the disease has been sufficiently prevalent to saturate the race, by its repeated and continued conferring of immunity ; thus, a disease that has become endemic must necessarily grow less and less virulent. Chronologically, the plague is older than the small-pox,¹ but while small-pox is daily growing less virulent, owing to the greater prevalence and the greater immunity acquired, from the before-mentioned causes, we possess—except it may be through a hybrid—no immunity against plague ; for whatever immunity was acquired during the Middle Ages from the repeated epidemics of this disease, would have since become exhausted.

No doubt, also, other diseases to which man

¹ Small-pox is stated to have been brought westward by the Saracens. Ahrun, a priest of Alexandria, first mentions small-pox in a treatise called *The Pandects*.—Bosstock's *History of Medicine*.

is prone have contributed to a certain extent to the gradual process of modification of each of them ; just as the diseases to which the cow has been subject during innumerable generations, in modifying the condition of its blood, has served to assist in the modification of small-pox in passing through it.

As against small-pox, the races that are subject to it are continually acquiring an ever-increasing endemic condition of the disease, not only by the suffering it, but also by compulsory vaccination. If vaccination be steadfastly persisted in, and we are not influenced by the Cranks, and the Blind, and the Narrow, the disease will ere long become eliminated from Europe.

The proportion of Cranks to the Level-headed in the community is larger than the Cranks suspect. Those particular sections of them yclept anti-vaccinationists and anti-vivisec-

tionists are not, I believe, large, but they make up for their paucity of numbers by the frequency and loudness of their objurgations. What growth would the Salvation Army, the latter-day Tarantists, have had without a brass band? Granting half the case of the vivisectionists, the rest might be put thus. If the slaughter of numerous animals could benefit mankind in the smallest degree, or even benefit one single individual, then the slaughter is justifiable. But, replies the anti-vivisector, you cannot prove that any such benefit has yet resulted from vivisection. Although this could be easily shown, let us assume for the moment that it is true. Does it preclude the possibility of benefit to mankind arising from it in the future? As well reason that because, for the past few years, no very notable advance has been made in steam engines, it is useless to attempt any further improvement.

The individual, when the disease affects him or his, will not stop to consider that his misfortune may benefit the race, nor will he be consoled thereby; and deep sympathy must be felt for those parents who have their children infected with some other disease than that intended, when inoculated with the cow-pox. For it is idle to deny that an inoculable disease cannot be inoculated. If any individual possesses the germ of any inoculable disease in his system when he is vaccinated, and lymph be taken from him for the purpose of vaccinating another, then the other inoculable disease may be planted with the vaccinia. It is equally idle to say, due care being taken by the operator, no other disease than vaccinia will be communicated, as evidence of the existence of congenital syphilis, or its transmitted and modified forms, scrofula and tuberculosis, or indeed of leprosy, is not necessarily shown on

the skin ; and it argues a greater than human penetration on the part of the vaccinator to be aware of its presence, if the bacillus be dormant. But it is more idle on the part of the anti-vaccinators to cite cases of the communication of these diseases ; for, let it be granted that all the cases cited are authentic—aye, let it be granted that these do not represent what actually occur by one half—even then the benefits that accrue to the race from vaccination are overwhelmingly in favour of its continuance. What short shrift would be made of the argument, that we should discontinue the use of railways because of the accidents that occur on them ; yet it would be equally reasonable. I said just now, let it be granted that the authentic cases do not represent what actually occurs by one half, but let us consider the other view. If the child were vaccinated that had up to the time of vaccination been perfectly healthy,

never had, as I have heard it urged, "a spot upon it," the presence of a fresh disease germ necessarily puts the system a little below par, the dormant congenital disease germ is then awakened, and may exhibit its effect in one of the many forms of the hydra-headed syphilis, or it may be as tubercle, or even leprosy. And this may be the case, even where the child or the adult from whom the lymph was taken immediately afterwards develops some evidence of the same disease. It does not necessarily follow that the second child acquired it from the first, not even in such a case as where it is known that the father of the first child is a syphilitic, as the parents of the second child may also be syphilitic, and having been successfully treated, may then show no traces of it, and yet possibly transmit the disease germ to one or more of their children.

The statistics of so many cases of certain

diseases *following* vaccination are of very little value, unless in each case it is indisputably shown to be on "account of it," not "after it." And it must be borne in mind with regard to leprosy, and its communication by vaccination, that this bacillus has a very long period of incubation, generally six months, even when the disease is acquired; but when congenital, there is no evidence to show that the disease may not remain dormant in the system for many years, as indeed it may do of tuberculosis or of syphilis.

Small-pox, like leprosy, is an old disease, and though its modified form, vaccinia, has not, like syphilis, had so long a period of time in which to approach the saturation point, yet the practice of vaccination—artificial, not natural—has been so universal in most European races for over eighty years—certainly for three generations—that the germ is more and more losing

its effect, and the disease is continually growing milder, the more it approaches the saturation point. Indisputable evidence could be adduced to show that small-pox has passed its prime; it has not nearly the virulence it once had,¹ nor yet its degree of epidemicity. This is, of course, in a large degree the continuous hereditary and other effect of vaccination; and in a smaller degree (since the practice of vaccination commenced a decreasing quantity), the effect of modification of persons infected with the disease itself, and the hereditary transmission of this modification.. But the same effect from the latter cause is also necessarily decreasing the effect of vaccination, and while, in the commencement of this practice, it was found that direct inoculation from the cow or calf produced too severe constitutional effects, and that it was

¹ Among white races.

advisable to further modify the virus, by passing it through one or more human bodies—arm to arm vaccination ; yet this practice, owing to the decreasing susceptibility of the race for the disease, dilutes the virus to such an extent, or it should be said modifies its action, and so much decreases its preservative effects to races like the European, so long inoculated with it, that it has caused the whole practice of vaccination to fall into a certain disrepute with the Unthinking. And the Blind not only lead the Blind, but they lead their way also those who half see and the Short-sighted.

The remedy for this state of things is to discontinue arm to arm vaccination, and vaccinate from the calf only, in those races in which the practice of vaccination has long existed. But this will not wholly take away its reproach with the Short-sighted, for small-pox has now lost so much of its virulence and epidemicity, rela-

tively to our races, that, if continued, in the course of probably another hundred years—assuming the Blind lead not all astray, and we lose the previously acquired immunity—it may become necessary to inoculate again with small-pox virus itself, if an entire preventive is desired.

It must be borne in mind, in making a comparison, small-pox with leprosy in this respect, that the duration of the former disease in the individual, relatively to the latter, is very short, and the same remark applies to their modified forms.

CHAPTER V.

FROM the point of view of Epidemiology, diseases may be roughly and broadly divided into two classes : those which clearly confer immunity, more or less, against a second attack, and those which apparently do not. But then, how far, in some of the latter, the appearances are real, and how far deceptive, owing partly to a greater natural tendency or susceptibility in certain families and persons to become the cultivating medium of certain organisms, it is impossible to say. That the cells of some persons have less resisting power to a common catarrh is known to every one. Moreover, although one cold, so called, does not appear to confer any immunity from another, yet it is extremely

questionable whether it does not in the aggregate confer a certain immunity upon the race, gradually tending to decrease its individual effects ; for it must be in the experience of every one, that a catarrh is more or less contagious, and apt to go through a household. From its present condition, catarrh must be a very ancient disease, that probably, in its youthful and epidemic form, decimated primeval man.

The writer, on one occasion, accidentally transferred some bacilli butyrici from a cultivation to one nostril, and experienced most of the effects of a violent though brief cold in the head, followed by acute rheumatic pains in the same side of the head. From subsequent experiments with the same bacillus, it would appear that the organism will not grow in the nostril, unless the temperature of the room in which the experiment is made is low, about 45° Fahr., although it flourishes best on gelatine

at 85° Fahr. Nothing that was tried appeared to have any effect upon the rheumatic pains, which gradually ceased in five or six days.

Both small-pox and measles were terribly destructive to life in the Middle Ages, and



Streptococcus Erysipelatos.
× 1000.

“St. Anthony’s fire was the dread of town and country.”¹

Smallpox first appeared in Egypt in the reign of Omar, the second caliph, and was brought thence from Arabia. Rhazes says that

¹ Hecker.

the fever of measles (A.D. 900) is more intense than that of the smallpox, and sometimes the more dangerous of the two.¹ By which it will be seen that either this disease, through the intervening centuries, must have been more infectious and prevalent, or the hereditary transmission of immunity must be greater than in small-pox, as certainly white races have more nearly reached the saturation point in measles. It is interesting to note that Rhazes first suggests that disease is a ferment in the blood, like that of must. But this did not include any idea of the germ theory, for he concluded that the ferment was innate, spontaneous, or inherent.

It would appear that some diseases leave behind them not only that modification, but that the modification may entail a predisposition to some other disease, not an infectious or

¹ Freind.

inoculable disease. Exceeding nervous and mental depression follows in the wake of influenza nowadays ; and the plague of the Middle Ages left, among other sequelæ, a condition of the nervous system that predisposed to that acute form of hysterical chorea, dancing mania ; indeed, the symptoms given by Hecker suggest frequently hysteria rather than chorea, though they probably generally co-existed. But it must be remembered that chorea implies a lesion of the central ganglia, and the dancing mania generally affected adults, while chorea is in this century mainly a disease of childhood.

The plague is a very ancient disease. Hippocrates, *De Morbis Popularibus*, and Thucydides, his contemporary, and afterwards Lucretius,¹ describe a pestilence that raged at

¹ It is possible that Lucretius may himself have seen the

Athens about 400 B.C., which was probably the plague.

In spreading the plague, the locusts were probably one of the factors, as a swarm of locusts that were hatched in the centre of the infection, *i.e.* where the organism producing this disease was just reaching the necessary degree of development to induce virulence under a hot sun, the insects would take the disease with them, and spread it in their subsequent flight. The Aleppo boil (*bouton d'Alep*) or Delhi sore, exists in an endemic

plague, as he says, book vi., "Of which sufferers, if any for a time escaped death, as was possible, either by reason of the foul ulcers (*buboes*) breaking, or by means of a black discharge from the intestines; yet consumption and destruction awaited him at last, or, as was often the case, an excessive flux of corrupt blood, attended with violent pains in the head, issued from the nostrils, and by this outlet the whole strength and substance of the man passed away."

form *only* in those localities where the plague has been known to originate. These are, the North of Africa from the Sahara to the Mediterranean, the valleys of the Euphrates and Tigris, Persia, and parts of India and Further India.

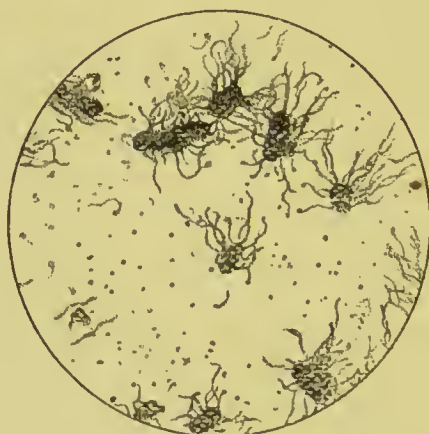
It is very noticeable that epidemics of typhus or petechial fever nearly always, during the Middle Ages, followed the plague, and also how similar in the earlier epidemics some of the symptoms of the latter were to some of the former, especially the hemorrhagic. According to Hecker, petechial fever arose in Granada in the year 1490, in the army of Ferdinand, following epidemics of the plague in 1488 and 1490.

Typhoid is apparently a later disease, and presents usually greater resemblances to the purely malarial form.

The three forms of bacilli resembling

typhoid, found by Cassedebat in Marseilles drinking water, were probably typhoid in different stages of development, or the undeveloped bacillus cultivated under different conditions.

During the cholera epidemics on the conti-



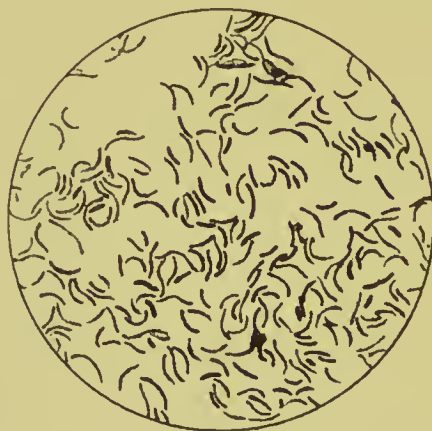
Typhoid Bacillus with stained Flagella.
× 1000.

ment of Europe, in 1865, 1873, 1884, 1892, and 1893, which occasionally reached this country, there were sporadic cases frequently occurring far away from the track of the epidemic, and in which no trace of the infection from the district where the epidemic was at work could be

found. The writer saw two cases of death within forty-eight hours of seizure in London, in 1884, with all the symptoms of Asiatic cholera ; and although inquiry was made, no possible explanation could be found for the existence of these separate individual cases, or connection traced with the existing epidemic in parts of the Continent, or in coast towns of England, where it obtained a temporary footing. Neither of these, as far as I recollect, were certified as Asiatic cholera. That these sporadic cases occur every hot summer, not only in Europe, but also in England, is extremely probable ; but the idea of cholera occurring in any other way but as an epidemic, is so opposed to the usual teaching, that the medical man attending, probably in nineteen cases out of twenty, does not certify the cases as cholera, or if so, as English cholera or cholera nostras.

A high atmospheric temperature, continued

for a longer time than we usually have in England, is obviously necessary to bring the cholera spirillum to a full development, that is to say, natural cultivation of it in the necessary media, for a sufficient number of generations,



Spirillum Cholerae Asiaticæ.
X 1000.

at a fairly high temperature,¹ is necessary to give the organism its full pathogenic results. And this rule will apply to any country. Anything short of this full pathogenic develop-

¹ The cholera spirillum will not grow on potato under 30° C.

ment renders the organism insufficiently virulent to readily attack the majority of the bodies in which it may be planted; the result is, it does not become epidemic, and probably goes no farther than the locality in which it was produced. Although possibly this organism, in its undeveloped state, may find a lodgment in as many persons in twenty-four hours as it would if in a fully developed condition, yet in that half-way position, as it were, between the saprophytic and the fully developed pathogenic, it failed to cultivate in the great majority of cases, while in the one or two persons attacked, usually young children, but sometimes adults, it probably met with an abnormal set of conditions, associated with the want of peristaltic action, which favoured its development, and the bacilli were cultivated. Insanitary conditions are beyond doubt necessary to the cultivation of the bacillus outside the body, but the immediate

sanitary surroundings of the individual attacked may be perfectly good, as the infection is most frequently conveyed to him in his water supply.

Pettenkofer's views upon the "drying zone," or the lowering of the water level, are, if sound, just as applicable to parts other than the deltas of the Ganges, Yang-tse-kiang, and the Nile, although it could hardly be maintained that cholera would not spread directly from patient to patient, if the food or drink be infected.

Not only sporadic cases, but epidemics also, have occurred in which no conveyance of the infection has been traced to the supposed sources, and the balance of evidence is in favour that cholera may be produced anywhere from a saprophytic form, provided this is cultivated to a sufficient degree in sufficiently favourable surroundings, the chief of them being a continuous high temperature for a suffi-

cient length of time, and the degree of its virulence or its infective capability, and therefore its power of spreading, are entirely dependent upon its stage of development.

The hereditary transmission of any immunity in this disease can never, under present conditions of treatment, be sufficiently great to affect any community to any appreciable extent, as the per centage of deaths is far too high; but that a certain degree of immunity is acquired individually for a considerable time against a second attack of cholera is well known; yet this effect upon the individual does not occur with sufficient frequency to affect a race.

It is most probable that the Metschnikoff bacillus, or chicken cholera, has the same origin as the spirillum cholerae Asiatici, but became a parasite in a different stage of development, or is a modification by different cultivation at a different temperature, as Gamaleia has shown

that inoculation with the former is to a certain extent a preventive against the latter.

The cholera bacillus, when grown on sugar, produces butyric acid, and when grown on albumen it forms ptomaines; and I have myself found that most of the suppurative organisms, when repeatedly cultivated on white of egg, either no longer liquefy the gelatine, or in a much less degree.¹

The inhabitants of the shores where yellow fever, a disease originally malarial, but largely assisted by insanitary surroundings, prevails, have by hereditary modification become practically immune from it. This immunity of the people in the aggregate from this disease must be hereditary, as it is enjoyed to a considerable

¹ In this respect, some very interesting results are produced, by repeated cultivations of streptococcus pyogenes in a mixture of white of egg, two parts, and castor oil, one part.

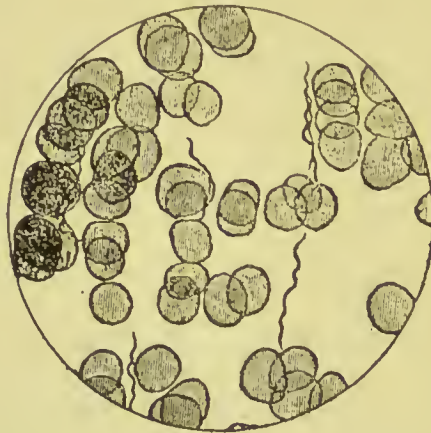
extent by those persons who have never had the disease, if members of families who have lived for some generations in the locality where the disease is prevalent ; but the degree of immunity is much greater in those persons who have had it.

Diseases having a purely non-parasitic or saprophytic origin have that peculiarity that, though continuously endemic in certain localities, they may suddenly take on such a degree of exacerbation and virulence from some local causes—probably an increased temperature and humidity—that the endemic becomes epidemic, and in spreading, when it reaches those races not usually subject to it, it becomes particularly death-dealing.

In Great Britain ague, even in the marshy districts, is almost extinct. Difference of environment and temperature during its production produces a certain variation in malarial fever according to locality.

Cities favour the formation of new or hybrid diseases, as the people are collected together closely in a small area.

Diphtheria, according to Hecker, arose in Holland in the year 1517, and according to



Spirillum of Relapsing or Malarial Fever,
with red blood corpuscles.
× 700.

Hecker's description of this epidemic, had greater resemblance to scarlet fever than it now has.¹ The epidemic was extremely fatal.

¹ Koch, *Traumatic Infective Diseases*, says, "May not the micro-organisms of pyemia and diphtheria be the same?"

There can be no manner of question that diphtheria is increased by bad sanitation, and that sewage in any form, or some condition associated with it, is a good medium for the growth and reproduction of this organism.

CHAPTER VI.

EPITOME.

1. THAT no contagious or infectious or inoculable disease takes up its abode in any person without leaving the person modified, that is, that the disease never leaves the individual exactly as it found him; and that this modification confers, in a greater or less degree, immunity against a second attack.

2. That this modification is transmitted to his offspring, and also in a decreasing ratio to each succeeding generation; so that the modification would disappear, if not renewed.

3. That this modification is accumulative in a race, owing to the continuance of the disease in successive generations, thus rendering each

succeeding generation less and less liable to the disease.¹

4. That there is a saturation point in a race for every such disease, at which a disease would die out, being no longer communicable to the individuals of that race.

5. That the disease, nevertheless, is itself comparatively unaffected, and retains its pristine vigour, if planted in any individual of a race among whom the disease is new.

6. That diseases by repeated co-existence or cultivation together in successive persons, may in some way combine, and form hybrid diseases, which partake more or less of the characteristics of the parent diseases.

7. That disease bacteria, by successive and repeated cultivation together, natural or arti-

¹ By this rule cholera is a comparatively new disease, while yellow fever is a comparatively old one.

ficial, in a non-parasitic condition, *i.e.* in other than living media, may form a hybrid or modified form.

8. That the natural hybrid disease is always more or less a prophylactic for, or antagonistic to, both parent diseases.

9. That the actual racial effect of the antagonism is in direct ratio to the duration of the hybrid disease in the individual, the prevalence of the hybrid, the number of people affected who survive, and the hereditary transmissibility of the hybrid disease.

10. That the modification produced by the parent disease is not a prophylactic for the hybrid disease.

11. That every contagious or infectious disease, therefore, by either the formation of a hybrid, or by hereditary transmission of the individual modification, tends to eradicate itself.

12. That a disease which may be epidemic

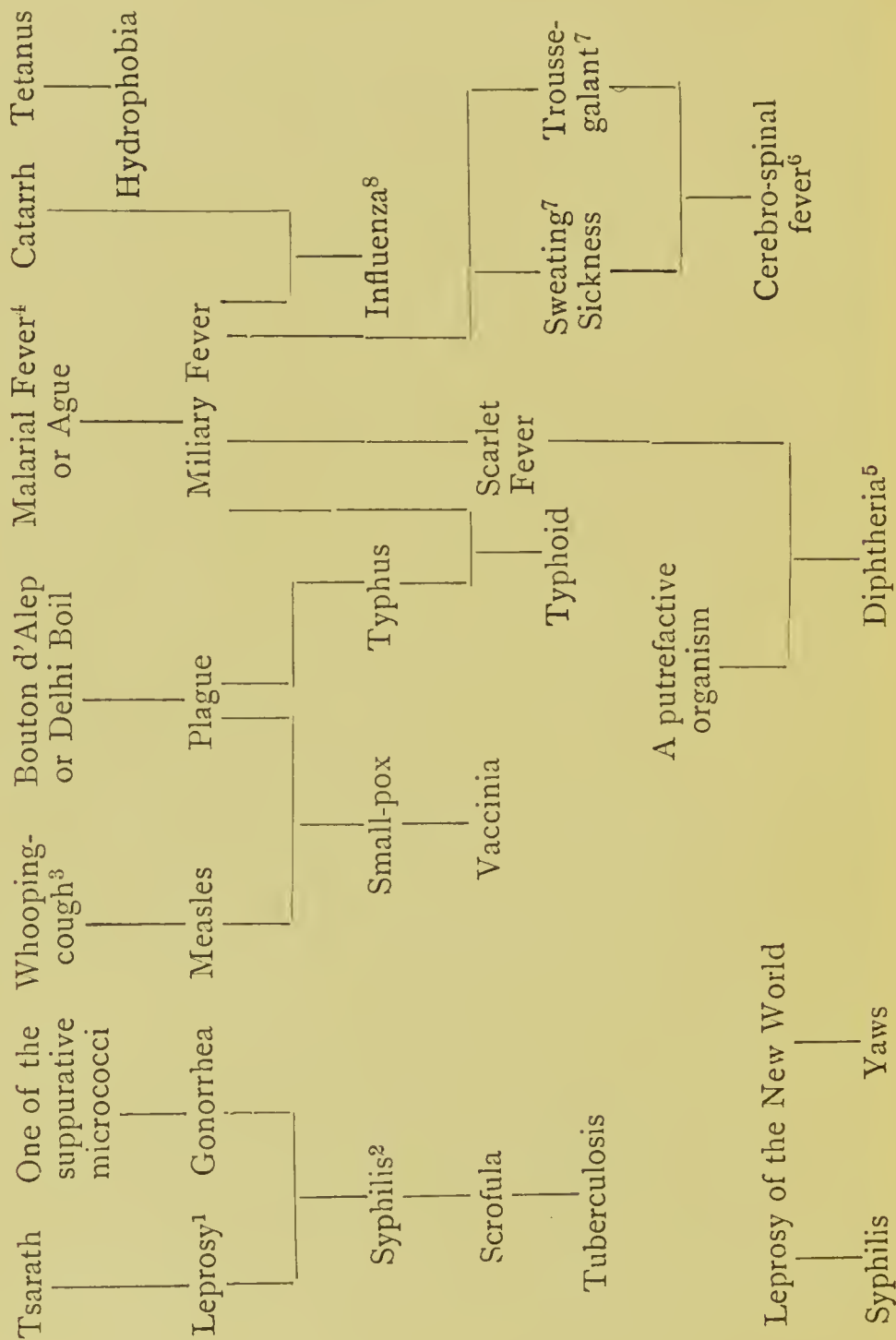
in its youth becomes endemic, and less and less contagious or infectious to a race the longer it exists in that race, owing to the increasing comparative immunity induced by repetition.

13. That innocuous or comparatively innocuous organisms may become pathogenic under the necessary conditions and temperatures by artificial or natural cultivations and development.

14. That the longer a disease organism has taken by natural cultivation in living media to reach a known form,¹ the more numerous the cultivations necessary to return it to its original form, and the more difficult of cultivation in other than living media.

¹ By form is meant not only microscopic appearance, but pathogenic effect. This 14 is a purely hypothetical statement, but it is practically a corollary from the foregoing.

A HYPOTHETIC ARRANGEMENT OF SEQUENCE OF INOCULABLE DISEASES.



¹ Bacillus discovered by Hansen.

² Bacillus discovered by Lustgarten.

³ Bostock, p. 140, says whooping-cough was first described in the fifteenth century, but it has all the appearance of a very ancient disease.

⁴ Remittent and intermittent fevers of same origin, although presenting differences of symptoms, and differences of appearances of specific organisms.

⁵ First recorded appearance of Diphtheria, Jan., 1517, in Holland.

⁶ This disease occurred in the Middle Ages, and is not a recent one, as has been supposed. First recorded in 1480, an epidemic in 1528 was called *Trousse-Galant*. Called in Germany, *Hauptkranheit*. Probably occurred for some years in succession in France, Germany, and Switzerland, after 1480; and it was one of the many forms of this disease that was carried into England by the lansquenets of Henry VII., in 1485, and spread over England in an earlier form as the *Sweating Sickness*, which had acquired in its new cultivation greater virulence and a more sudden invasion, but had dropped its sequelæ.

⁷ There can be little doubt that the *Sweating Sickness*, *Trousse-Galant*, and *Hauptkranheit*, or infectious Encephalitis, and the modern *Cerebro-spinal fever* are all different forms of what is practically one disease, varying in its symptoms and duration according to the degree of development of the original infection, and modified by the circumstances under which it was produced, and the locality of production; nevertheless, not varying more than *Influenza* has varied in its different epidemics.

⁸ First authentic recorded epidemic occurred in 1414, but it had probably appeared before this.

CHAPTER VII.

A DISEASE which in its youth is very contagious or infectious, in its old age, then, becomes comparatively non-contagious, or non-infectious, and progressively less and less contagious or infectious as the race reaches the point of absolute saturation. And those microscopic organisms which formerly constituted disease, by a process of continuous acclimatisation, as it were, invaders and invaded having so frequently and so long lived together, that it might possibly be in some cases that the invaders become allies and join the great army of defenders, and assist to throw out and destroy those of their own species who seek to invade.

Nevertheless, while old diseases are thus being stamped out, new diseases may be formed from the old, and a stream of death is thus ever running concurrently, and hand in hand with that of life, the new developing from the old, and tending to eliminate its origin ; yet there may possibly be a time when the blood of man, owing to what it has been through in the past, the civilisation, the continuous acquisition of prophylactics within itself—that man will be proof, given perfect sanitary surroundings and antiseptic precautions, against any or all inoculable diseases which can be brought against him.

“OFFICIAL VISIT TO A LEPER SETTLEMENT.—Some piteous scenes witnessed on the occasion of a visit to the leper settlement are recorded in a Reuter's message, dated Cape Town, July 26th, 1893.

“At the invitation of the Colonial Secretary, the Hon. R. H. Faure, a large number of

members of the Cape Parliament proceeded to Robben Island last Saturday, to make an inspection of the Leprosy station there. Dr. Impey, the Resident Surgeon, received the visitors and conducted them round the wards, which were pronounced by every one to be comfortable and clean. Some very painful cases were pointed out, and the members engaged several patients in conversation. No complaints were made against the food, the accommodation, or the administration of the hospital, but there were many sorrowful appeals to be sent home. The poor creatures buried their faces in their hands, and wailed piteously to be taken back to their friends. Others, again, sat on their clean white beds, bending forward to hide their diseased limbs, saying nothing, but looking beseechingly at the visitors. The picture was really a very sad one, and the visitors did their utmost to cheer the poor

lepers, but could not comfort them, their kindness only having the effect of increasing the patients' anxiety to be sent home to their families and friends. There are 500 lepers on the island. The majority of them are natives, and the arrangements made for the comfort of the unhappy people reflects the greatest credit upon the authorities. After the inspection the visitors partook of lunch, and afterwards spoke in eulogistic terms of the efforts made by the Government officials and the lady visitors to brighten the lives of these poor stricken people."

The foregoing paragraph, cut from one of the morning papers, I have taken as my text for what follows. Is it not a disgrace to our great empire, that takes upon itself a paternal control of so many races and peoples, that no effort is made by the chief authority, the central Government, to endeavour to discover some

remedy to at least alleviate the sufferings of the doomed leper, even if it be regarded as impossible to cure him? And surely some effort might be made even in this latter, the cure; although up to the present unfortunately all cure has been impossible, yet this is no reason why we should sit down, wring our hands, deplore the terrible evil, and make no effort to remedy it; our attitude in this matter is so much more like the Oriental than the Anglo-Saxon, a bowing of the head and muttering "kismet." And as with the remedy, so with the causation of leprosy, our rulers leave everything to unaided individual effort. Commissions and reports, no doubt, add a little to the sum total of our knowledge as to the number of cases, and where the disease is most prevalent, and are also valuable in recording the opinions of a number of experts but this is not what is wanted.

Let this reproach be taken from us. And this can only be done in some such way as the following:—An Institute should be founded and endowed, in some part of the empire, for the express purpose of research into the bacteriology, etiology, epidemicity, and sequence of diseases, particularly with a view to the discovery and formation of hybrid or modified bacteria, for inoculation in the treatment of disease.

In such an institution, therapeutics, in the present sense of the word, the treatment of disease by medicine, would take a very secondary place.

In this institute continuous research and investigation should be carried on, with a view to discover the causation, methods of development, and the origin of the disease micro-organism (for it is now practically certain that no infectious, contagious, or inoculable disease can

occur without its specific micro-organism), the cultivation of hybrid organisms or modified forms for the cure of the parent disease, the closer investigation of epidemics, and an endeavour to trace the sequence of diseases from their primary forms. These investigations and the necessary experiments, to have their proper value, should not be carried out upon animals only as subjects.

Let the convicted murderer, who has forfeited his life to the community, employ that life thereafter for the benefit of the community. "The worst use you can put a man to is to hang him," and electrocution is only a refinement of modern barbarism. Let the forfeited life, forfeited for destroying life, be used to save life.

Let the convicted murderer be handed over as a subject to such an institute. It would still be a prison, but a prison in which they would

lead useful and comparatively comfortable lives. To exchange death, and a most horrible one, hanging, for a comfortable existence, good food, and a good library at the public expense, would surely be preferred by most of them ; and to still the prejudices of the Hysterical, he should be given his option, let him elect which he prefers, death, or the probability of living in ease at the public expense, all reasonable wants supplied to old age.

The usefulness of such an institution, and the knowledge that mankind would gain from it, would be simply incalculable. In the course of a few years each disease might be labelled with statistics. The laws of the frequency, rapidity, mode of action, and means of spread of each disease, by infection or *cóntagion*, and each degree of infectiousness or contagiousness might be tabulated ; and “ forewarned is forearmed.” The idiosyncrasies of epidemics

would be made clearer, and many of the most puzzling of Nature's secrets, so far as disease is concerned, would be brought to light; for diseases might be studied in the aggregate as in the individual.

With all the condemned, or such of them as elected to serve their fellow man in this way, as some atonement for the life taken, collected in one building from all parts of the United Kingdom, contagion might be imported, and each disease watched in the mass as in the unit. For in a fever hospital, at the present day, each respective disease is incubated outside among the people, and not brought inside until it has manifested itself. Again, cases inoculated with leprosy, for instance, might receive repeated inoculations of erysipelas, with a view either to a cure, or the formation of a modification or a hybrid form. A modification with a disease powerfully contagious might

possibly act sufficiently quickly to enable the modifications to be employed as an inoculation against the progenital disease. Nevertheless, this would not act as a cure for the parent disease, when already existent, as where two diseases, even when antagonistic, co-exist, they usually run concurrently, manifesting the symptoms of both of them, but it would probably alleviate it.

The sequence of diseases should be investigated, for an instance, as to whether diphtheria could not be cultivated in living media, back to its alleged parent form—scarlet fever. And it should be the function of the institute to determine as far as possible the commencing condition of those diseases that are in a sere old age, such as mumps, whooping-cough,¹

¹ Bostock, in his *History of Medicine*, says that it is not until the fifteenth century that we have the first correct

chicken-pox, and possibly herpeszoster, and to show what relation, if any, the alleged extinct diseases have to modern forms. Again, the relation, sequence, and position of the syphiloids that have occurred more or less locally at different times in Europe, as the Chavanne Lure syphilis,¹ Sibbens, Scherlievo, etc., require determining, although these were probably true syphilis in the more epidemic form, owing to the lower degree of immunity of the inhabitants of the locality where the disease occurred. The relation and sequence also of beri-beri, and senki or kakke to leprosy should be determined. And light, above all, should be thrown upon the mystery of cancer.

description of whooping-cough, but from all appearances it would be a much older disease.

¹ Rayer, p. 1145.

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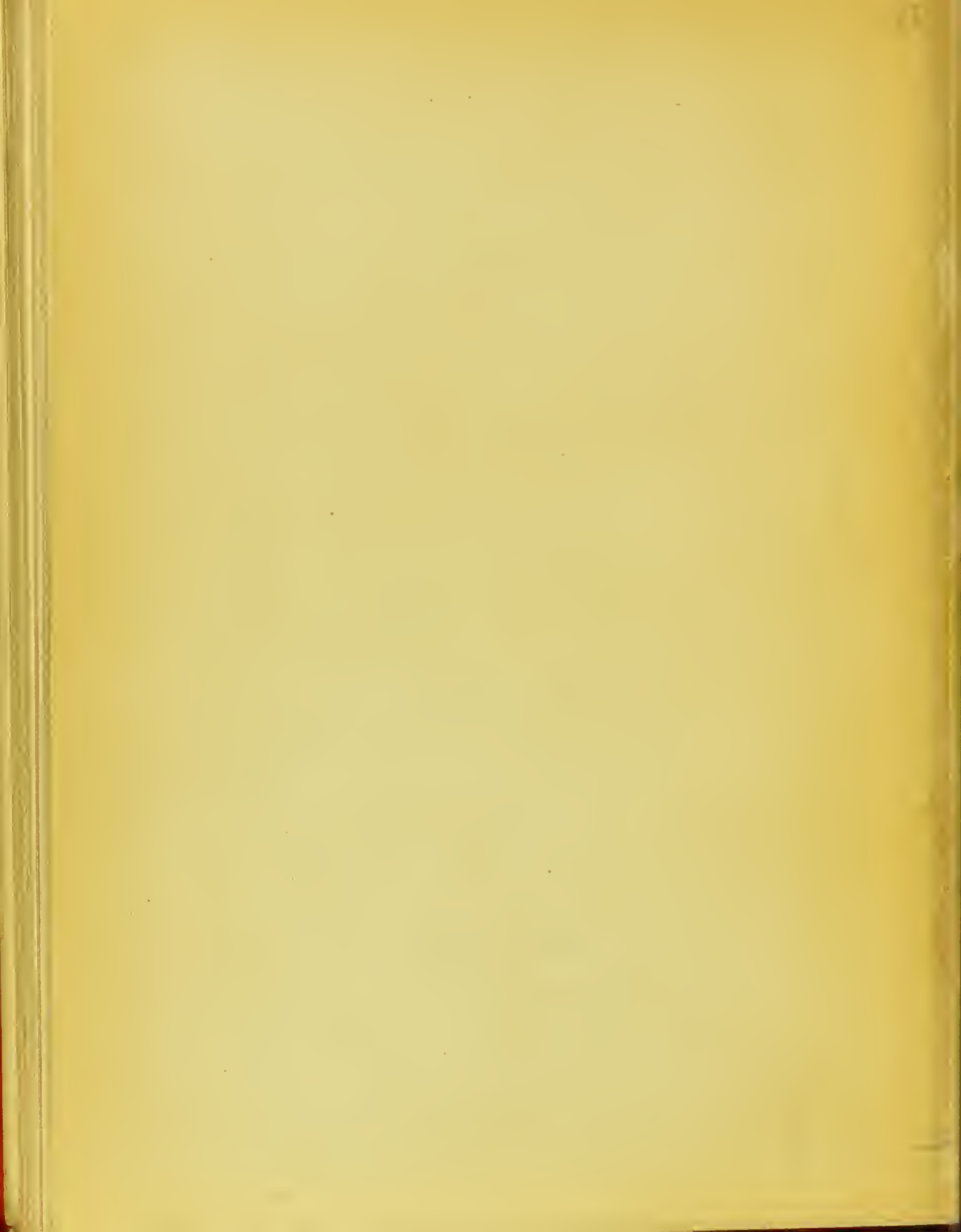
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16. J. B.

